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ABSTRACT

This study was designed to assess and analyze parent, student, and teacher evaluation of specific aspects of the curriculum and science teaching in the Trinidad and Tobago elementary school system. The effect of teacher involvement in curriculum development on student interest, curriculum effectiveness, and student, parent, and teacher attitude to the curriculum was also examined. Three questionnaires were used that dealt with perceptions of parents, students, and teachers of the science curriculum. Analysis of the questionnaires indicated that most parents, students, and teachers found the curriculum to be exciting, effective, and interesting. Concerns about science and how to teach science were greatest among teachers with a weak science background. Tables of questionnaire results are included as well as a bibliography. (ML)

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AN ANALYSIS OF TEACHER, STUDENT AND PARENT EVALUATION OF AN ELEMENTARY PROCESS-APPROACH CURRICULUM

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Over the past few decades theories of instruction, the design of science curricula and views on the nature of science and science teaching have undergone a variety of modifications. Many countries, developing and developed have experienced a wave of elementary science curriculum development, revision or adaptation.

Traditionally teachers have been presented with science curriculum material and have been expected to teach science. However this has resulted in disillusionment with the scope and quality of curriculum implementation and developers are beginning to realize the role teachers can play in the process of curriculum development. Teachers are better aware of the classroom situation and if they play an active role in producing classroom material they are more prone to implement the use of this material. Connelly (1972) articulates this belief when he says

> The strength and major contributions of a developer are that he works with and can translate involved ideas into a form useful for teachers and students. However, the developer cannot assign, let alone account for the full range of teaching situations that arise. It is here that teachers' experience and wisdom enter into the curriculum planning in a way that cannot adequately be replaced.
>
> (p 79)

Tyler (1975) accuses curriculum developers of creating non-teachable curricula because they do not know the classroom reality; he feels that teachers should play an active role in curriculum development.

Active teacher participation in curriculum development generally takes two forms:

1. during implementation, teachers adopt or modify the curricula which were produced by other developers, and they design alternative optional activities if they so desire.
(Connelly, 1972; Silberstein, 1978)

2. Teachers act as developers from the initiation of a project.
(Rudd, 1975; Gray, 1974, Presst, 1978).

According to Beauchamp (1981) the history of curriculum implementation is weak. Many curricula have been planned, but few have been systematically implemented. In many cases the curriculum once it is produced, collects dust on a shelf or is filed neatly in the teacher's desk, while the teacher reverts to the old pattern of teaching used prior to the development of the curriculum. Curriculum planning/circumstances under these is a tremendous waste of human effort except for the concomitant educational gains for the planners.

Fullan & Pomfret (1977) in their very comprehensive review and analysis of research on curriculum and instruction implementation point out that we know virtually nothing about the implementation process because of the tendency to leap from the planning stage to the observation of outcomes without assurance that the change or innovation was

systematically implemented. They concluded that 'effective implementation of social innovations requires time, personal interaction and contacts, in-service training and other forms of people-based support.' (p 391)

Beauchamp (1981) claims that a necessary prerequisite for curriculum implementation is the commitment by teachers to use the curriculum. The degree to which teachers lack commitment to the curriculum constitutes a potential barrier to curriculum implementation. The strength of the commitment may be enhanced by an implementation directive being part of the curriculum, teacher participation in the curriculum planning and administrative leadership.

Curriculum implementation is facilated if teachers who are to use the curriculum participate in its planning, since involvement is believed to lead to follow through. Johansen (1965) and Duet (1972) both concluded that both individual teacher participation in curriculum planning activities and perception by teachers that they were influential in curriculum decision making increased the likelihood of curriculum implementation. Duet's results also showed a significant relationship between teacher participation on curriculum committees and their implementation practices.

Langenbach (1969) in a study of teacher attitudes found a significant difference in attitude of teachers toward curriculum use between those who had participated in the planning phase and those who had not. Previously Hensner (1963) and Nault (1965) had come to a similar conclusion but they cautioned against assuming that participation in curriculum planning alone would ensure implementation.

Evaluation of teacher use and attitude is logically a first step that is almost universally overlooked in curriculum evaluation. The enthusiasm of teachers for using the curriculum in some way can determine the quantity of use. The success of teachers in the use of the curriculum would have evaluative implications for the adequacy of the design, so also would the success of the curriculum in achieving student learning, interest, enjoyment, understanding outcomes.

Ultimately the teacher is the person who must implement a curriculum but collectively teachers will not implement the curriculum solely on their own initiative. The exercise of leadership is critical for a systematic implementation of any curriculum. This is where the principal or Ministry of Education can play an important role.

What effect does involvement of teachers in curriculum planning have on curriculum implementation? Beauchamp (1981) claims that 'little-hard-nosed research is available to provide an answer to this question. He further claims that at present it is being answered subjectively by those responsible for making curriculum decisions and this practice cannot be faulted in most situations. Does the level of involvement determine the level of participation in implementation and the attitude of the teachers, and students to the curriculum.

In the Trinidad and Tobago elementary school system, the curriculum is established by the Ministry of Education all schools have the same curriculum. The science curriculum details what is to be taught, how it should be taught at each level and the amount of time per week to be devoted to sceince. Along with the curriculum are teachers guides, which each teacher is required to use. The final examination at the end of elementary education, the results of which determine what type of secondary school the student enters is based on the curriculum.

The development of a new elementary science curriculum commenced in 1977. Three basic premises have served as guides in the development of the elementary science process approach curriculum. The first is that a scientist's behaviour in pursuing science constitutes a complex set of skills and intellectual activities which can be analysed into simpler skills and activities. The second is that these skills and activities can be learned starting with the simpler skills in the early grades and progressing to more complex skills later on with integration of skills as you move up. The third is that a particular process skill can be developed using content from different areas of science. In the process of curriculum development the following factors had to be considered.

1. the science background of the teachers.
2. the attitude of the teachers to science and science teaching.
3. the cognitive development level of the students.
4. available facilities at the schools.

The completed curriculum emphasises the process approach to science teaching. The curriculum was designed to be taught to students, whose parents come from a wide range of educational, economical and social backgrounds and were required to be involved as resource persons, providers of some teaching materials and for stimulating interest in science in their children. Students were from varying cognitive developmental abilities (Fraser-Abder, 1977) and at the end of elementary education only 2.8% had attained the late concrete level which Adey and Manbodh (1977) showed to be required to cope with the secondary level syllabus. The new curriculum therefore had to cater to a wide range in intellectual development in any given class, to better prepare students for secondary science and to stimulate and maintain student interest and enjoyment in science. Teachers at the start of the curriculum development were observed to have a negative attitude to science teaching and a poor science background (Fraser-Abder & Shrigley, 1980). Classroom teacher involvement in curriculum development implementation and evaluation placed them into three categories:

CATEGORY I

Teachers who were involved in developing and writing lesson activities for inclusion in the Teachers Guides and who later served as resource persons in the implementation phase. These also received science content instruction.

CATEGORY 2

Teachers who received Teachers Guides and attended dissemination workshops at which they were shown how to teach the lessons and were later involved in teaching lessons to their peers at the workshop. These teachers received less science content instruction than those in Category 1.

CATEGORY 3

Teachers who received Teachers Guides and taught their classes with no outside interference.

This study was designed to assess and analyse parent, student and teacher evaluation of specific aspects of the curriculum and science teaching and to determine what effect teacher involvement in curriculum development has on student interest, curriculum effectiveness and student, parent and teacher attitude to the curriculum.

Sample

Teachers

The 418 teachers who served as subjects were teachers who voluntarily responded to a questionnaire sent to 500 teachers randomly selected from a list of 627 schools. Table 1 shows a profile of the teacher sample.

TABLE I

Profile of Teacher Sample

Category	Variables	No of Teachers
School type	Government	75
	Denominational	341
	Private	2
Gender	Male	123
	Female	295
Upper level of Science Exposure	Teacher's College Certificate	386
	GCE O'level Science	24
	Secondary School Science (no certificate)	5
	Elementary School Science	3
No of years teaching	0 - 5	49
	6 - 10	72
	11 - 15	142
	16 - 20	62
	Over 20	93
Grade taught	1	50
	2	86
	3	104
	4	40
	5	45
	6	93
Curriculum Involvement Category	1	25
	2	160
	3	233

Students

Eight classes were randomly selected from each of the three curriculum involvement categories. A total of 700 students responded to the questionnaire.

TABLE 2

No. of Student per Teacher Curriculum Involvement Category Profile

No. of Students	Teacher Category
224	1
231	2
255	3
TOTAL 700	

Parent

The 700 randomly selected students were asked to take questionnaires home to their parents. Only 140 parents responded voluntarily.

The three questionnaires used dealt with perceptions of parents, students and teachers of the science curriculum. Specific assessment in each category included:-

Teacher Questionnaire

a. Teacher interest in the curriculum.

b. Teacher evaluation of the curriculum.

c. Difficulties experienced in teaching the programme.

d. Usefulness of the Teachers Guides.

e. Attitude to the curriculum.

Student Questionnaire

a. Student interest

b. Student enjoyment

c. Student understanding

d. Student participation

e. Attitude to the curriculum

Parent Questionnaire

a. Parental involvement

b. Parental perception of student enjoyment

c. Parental opinion of the teaching of science

d. Parental opinion of the effect of science on the child

e. Attitude to the curriculum

The reliability correlation coefficient for the teacher questionnaire was 0.92, 0.90 for the student questionnaire and 0.87 for the parent questionnaire.

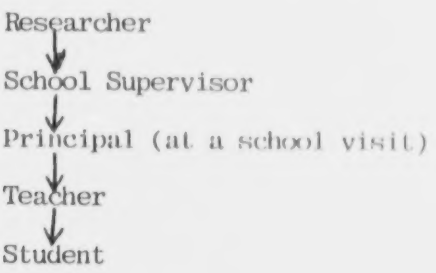
Procedure

The 500 randomly selected class teachers were given the questionnaires by their principal. The routing of the questionnaire was:-

Researcher
↓
School Supervisor
↓
Principal (at a Principal's Conference at the start of the school term)
↓
Teacher

Response to the questionnaire required no more than 30 minutes On completion of the questionnaire the teachers returned them to the researcher via the principal and the school supervisor. Distribution, completion and return of the questionnaires took place over a period of four weeks.

The students in the 24 randomly selected schools were contacted via the same routing as the teachers.



These questionnaires were administered 8 weeks after the teacher questionnaire. Response to the questionnaire required no more than 15 minutes. The class teacher was requested to administer the questionnaire. Distribution, completion and return to the researcher took place over a period of 2 weeks.

The students in the sample were given the parent questionnaire with a letter from the researcher endorsed by the principal and the school supervisor asking them to complete and return the questionnaire via the child the day after receipt. Response to the questionnaire required no more than 10 mins. These questionnaires were returned to the researcher along with the student questionnaire.

Results

Teacher responses to questions dealing with interest and evaluation of the curriculum; difficulties experienced + method of handling; and usefulness of the Teachers Guides are tabulated in Table 3.

Teachers

TABLE 3

Teachers Reponses to four group of questions

Area	Responses					
	1 least positive	2	3	4	5 most positive	Mean
Interest in the curriculum	16	17	21	188	176	4.24
Evaluation of the curriculum	3	12	44	265	94	4.07
Difficulties experienced and handling strategy	4	14	76	254	70	3.90
Usefulness of the T G	11	9	30	188	180	4.20

Chi-square + ANOVA results for the entire teacher sample are presented in Tables 4 and 5.

TABLE 4

Chi-squared test for attitude to the curriculum tabulated according to Teacher Involvement in Curriculum Development.

			Category					
			1	2	3	Total	df	χ^2
Attitude to the curriculum	least positive	1	1	60	214	275	8	189.07 xxx
		2	24	211	422	657		
		3	53	346	808	1207		
		4	308	1785	2177	4270		
	most positive	5	114	798	1029	1941		
	Total		500	3200	4650	8350		

TABLE 5

Analysis of Variance of Attitude to the Curriculum/Category of Teacher Involvement in Curriculum Development

df	SS	MS	F	Source
19	4.3451	0.22869	3.49 xxx	Question
2	1.0012	0.50061	7.65 xx	Category
38	2.4879	0.65472		Error
59	7.8343			Total

Overall mean	3.89
Category 1	4.02
Category 2	3.95
Category 3	3.71
SE	± 0.06

LSD showed category 3 to be significantly different at the .01 level. of significance.

The means for the 3 curriculum involvement categories of teacher in the areas of interest, evaluation, level of difficulty, usefulness of the Teachers Guides are in Table 6.

TABLE 6

Means of teacher responses in four areas and their Curriculum Involvement Category

Category	Interest	Evaluation	Difficulties experienced	Usefulness of Teachers Guides
1	4.36	4.38	3.92	4.21
2	4.24	3.97	3.84	4.27
3	4.11	3.76	3.92	4.12

Student

The responses of students to 4 questions are tabulated in Table 7.

TABLE 7

Students' Evaluation of the Curriculum

Question		Yes	No	Not Sure
1.	Do you find science interesting	666 (95.15%	10 (1.4%)	24 (3.5%)
2.	Do you enjoy working in groups	580 (82.8%)	85(12.1%)	35(0.1%)
3.	Do you find science lessons easy to understand	492 (70.3%)	94 (13.4%)	114 (16.3%)
4.	Would you like to do science in secondary school	624 (89.1%)	17 (2.4%)	59 (8.5%)

Parents: The responses of the 140 parents to 6 of the questions are tabulated in Table 8.

TABLE 8

Parent Responses

Questions	Parent Response				
	Yes	%	No	%	Total
1. Does your child tell you what was done in Science at school?	114	81.4	26	18.6	140
2. Do you find the work being done in Science is too difficult for your child?	15	10.7	125	89.3	140
3. Do you think your child enjoys his/her science lessons?	137	97.9	3	2.1	140
4. Do you think you are called upon too often to provide equipment for school	13	9.3	127	90.7	140
5. Is involvement in Science making your child a better person	132	94.3	8	5.7	140
6. Do you think your child will be eager to do Science in secondary school	134	95.7	6	4.3	140

Table 9 shows overall mean attitude scores for teachers, students and parents tabulated against Teacher Involvement in Curriculum Development Category.

Category	Mean Attitude Score					
	Teacher		Student		Parent	
	Mean	N	Mean	N	Mean	N
1	4.76	8	4.85	224	4.94	67
2	4.21	8	4.47	231	4.44	48
3	3.57	8	4.31	255	3.91	25

Teachers

Most teachers found the curriculum interesting. They thought the lessons were appropriate, the objectives were appropriate for children in their class, the Competency Measure Tasks tested the objectives. Their difficulties revolved mainly around their belief that the materials required were too complicated, this problem however was mainly experienced by Category 3 teachers who were not involved in sessons dealing with the use of material that could be easily found at home, in school or brought in by students.

Teachers Guides
The /were judged to be useful, and the vocabulary was not too difficult for the teachers.

Students

The results indicated that most of the students found their science to be interesting and enjoyable; they understood what was being done and enjoyed group participation. Over 89% eagerly anticipated secondary school science. When asked what would you like to be when you grow up 36.3% selected a career which involved post-secondary science.

Parents

81.4% of the children discussed what was done in Science at school with their parents. The fact that these parents responded to the questionnaire is probably an indication of their interest in the child's science activities. 18.6% did not discuss science done in school.

97.9% perceived their child as enjoying science, while 95.7% felt that their child would be eager to do secondary science.

10.7% felt that the work being done was too difficult for the child, while 89.3% felt that the work was within the capability of their child.

94.3% felt that science was making their child a better person.

When asked to express their opinion of the new approach to teaching elementary science parents felt that it was more interesting than in the past, it helped to broaden the child's overall perspective and generally was rather effective.

It should be noted that of the parents who responded - 95% had above secondary education, while of those who did not respond. 90% had secondary or below level of education. There appears to be some correlation between level of education and interest in offsprings science performance if one uses responses to the questionnaire as a measure of interest.

It was seen that the attitude of teachers, students and parents who were in Category 3 was the least positive with Category 1 participantsbeing most positive. Teacher involvement in curriculum development did affect teacher, student and parent attitude to the curriculum. These results lend support to the findings of Fullan and Pomfret (1977) and Beauchamps (1981) who claimed that effective implementation requires in-service training and other forms of people based support. Full implementation was enhanced by the national mandate that the curriculum be used by all students and be part of the national examination. The study also supported the findings of Johansen (1965), Duet (1972) and Langenbach (1969) who found a significant difference in attitude between teachers who participate in curriculum development and those who did not; however in this study there were 2 levels of participation with Category 1 not being significantly different from Category 2. It would appear that teachers benefit equally by being in the activity writing stage as in the stage where they use what has been developed and are told how to use it, and given supervised practice in using the curriculum.

Analysis of the questionnaires indicate that most parents, students and teachers found the curriculum to be exciting, effective and interesting. Category 1 teachers were most effective in achieving the aims and objectives of the curriculum and in stimulating a positive attitude in their students and parents. However it is clear that teachers have concerns about science and how to teach

science; these concerns are greatest among teachers with a weak science background. It would appear that further future inservice training for teachers is necessary in order to ensure longevity and effectiveness for the science curriculum. The data however suggest that the nature of the curriculum allows teachers to present a positive and exciting image of science.

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